January 31, 2018

VIA E-MAIL (albert.shuldiner@fcc.gov)
Albert Shuldiner
Chief, Audio Division, Media Bureau
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: Docket 17-105

Dear Mr. Shuldiner:

I am writing this to present you a brief overview of a matter that I have been involved with which I believe has been and will be the subject of discussion in the Media Bureau and the Audio Division. In this regard, I have worked as a consultant with Geo Broadcast Solutions, developing multiple node (multiple transmitter) booster systems known as "Maxxcasting™" systems. These systems use several boosters synchronized both with the main transmitter and with each other to produce nearly seamless transitions between nodes to cover a targeted area and to provide better coverage in these targeted areas than possible with only the main transmitter. I have worked with Geo as well, evaluating the "Zonecasting™" system in FCC authorized tests. Zonecasting combines the attributes of "Maxxcasting" during most of the broadcast day, however, during limited times, localized information is broadcast only on the booster nodes. During the times when localized information is broadcast, the operation is called "Zonecasting".

Below I will discuss how advances in technology, not available until the last year or two, have allowed us to develop advanced, tightly synchronized booster systems which allow us to do things never before possible.

Booster synchronization requires four things to "trick" the receiver into thinking that it's hearing one station instead of two or more (with resulting distortion and interference). They are:

1. Carrier Synchronization, now possible by using GPS trained oscillators.
2. Pilot phase synchronization, again possible by GPS
3. Use of small cells with highly directional antennas to keep the real-time FM waveforms at the receiver to within 2 microseconds. The technology to adjust the timing to within 2 microseconds difference has only been perfected within the last year. RF modeling and prediction is accomplished with powerful software tools developed for cellular communications by the wireless industry and this allows us to precisely tailor parameters to maximize coverage and minimize areas of interference.
4. Maintaining audio modulation to less than 0.25dB difference between the main and all nodes. This has only been possible recently by AES digital transmission and synchronization.

For Zonecasting, although items three and four cannot be accomplished due to different program material on the main and booster nodes, items one and two remain synchronized. The antennas in item three tightly controls where the different programming goes and tightly rolls off the signal at the edge of coverage to keep any interference minimized. We have found that maintaining modulation peaks as close to identical as possible (even though it's different programming) further helps reduce interference between the main and zone area.

In tests conducted at WIIL in Milwaukee, the results were impressive. During times of fully synchronized Maxxcasting operation, in-building listening to WIIL, which was previously difficult since Milwaukee is on the edge of the station's 54dBu class B contour, was instead receiving 70-80dBu of solid signal in downtown buildings with virtually no discernable

transition areas. When the different programming and additional transmitters were introduced for Zonecasting, transition areas were tightly controlled and any self-interference was limited to only a couple city blocks, only a very small percentage of the overall coverage area and for a very limited period of time.

In conclusion, in my professional opinion, the FCC requirement, found in Section 74.1231(i) of the Commission rules, requiring that booster programming for full power FM stations be identical to the main at all times has outlived its usefulness. Due to advances in synchronization technology and RF modeling, it is now possible for synchronized boosters to not only improve coverage in shadowed areas, but also within a station's coverage area, allow specialized targeted information to be delivered with diminimis negative impact to listeners in the small and tightly controlled transition areas.

I would also like to note that implementation of Zonecasting would allow for targeted emergency announcements. This would be consistent with the spirit of Chairman Pai's recent pronouncements relative to wireless technology.

Sincerely yours,

Bertram S. Goldman

cc: Alison Nemeth, Esq.
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